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	Ref#	Project Name	Description	Sector	Therapeutic Area	Tag	Lead PI Last Name	Lead PI First Name	PI Department	Stage of Development	IP Status	Commercialization Focus
Recently Added	5603	Inhibition of Fgr Reduces Radiation-Induced Profibrotic Markers	Using RNA-sequence analysis with a pure population of sorted radiation-induced senescent cells, University of Pittsburgh researchers found that Fgr mRNA is upregulated by more than 70-fold exclusively in senescent cells. Previous research does not implicate Fgr in RIS-induced lung fibrosis. Pharmacologic inhibition of Fgr in senescent cells reduced profibrotic gene expression in targeted cells, heralding the potential to prevent fibrosis from developing in individuals who have sustained radiation damage.	Life Science - Small molecule	Respiratory		Mukherjee	Amitava	Med-Radiation Oncology	In vitro data	Provisional patent application filed	License
Recently Added	5579	Novel Approach to Discovering Repurposed Drugs and Compounds for Treatment against SARS-CoV-2 Infection	Rather than targeting viral proteins, Pitt researchers aim to exploit the natural antiviral programs that arm host cells and used a comprehensive, mechanism-unbiased, and highly integrated systems-level approach. A set of 38 priority candidate compounds targeting the host system, including repurposable and computational drugs, were identified using computational modeling. Fifteen compounds have potential antiviral actions, while 23 have possible anti-hyperinflammatory capabilities. Fourteen have been selected for in vitro assays with different cell lines. Several of these compounds inhibited SARS-CoV-2 infection in a dose-dependent manner, with two showing particular efficacy. These findings expand the repertoire of drugs and compounds that can be repurposed or developed for treating COVID-19 either independently or in combination with each other.	Life Science - Small molecule	Infectious Disease		Cheng	Hongying	Med-Computational Biology	In vitro data	Provisional patent application filed	License
Recently Added	5559	Small Molecule Allosteric Modulators of Class B GPCRs in the PTHR and Method to Identify Them	The allosteric drugs disclosed here were designed to specifically modulate selected interactions with the PTHR upon altering its structural mechanics. This “allo-targeting” approach is being hailed in drug discovery and development for its use in designing efficacious therapies. A structure-guided computational approach was used to identify allosteric druggable sites in PTHR and to predict compounds that would bind to this site, and Pitt researchers discovered four small-molecule compounds that act as negative allosteric modulators of PTHR signaling. Further computational protocols indicated that the experimentally-identified small molecule drug candidates were predicted to bind to this site, lending more evidence to the use of this computational approach to discovering druggable sites in other class B GPCRs.	Life Science - Small molecule		Hyperparathyroidism; Osteoporosis; Cancer cachexia	Sutkeviciute	Ieva	Med-Computational Biology	In vivo data	Provisional patent application filed	License
Recently Added	5557	A New Peptide to Treat Glioblastoma by Modifying the Tumor Microenvironment to Enhance Antitumor Immune Response	Pitt researchers have discovered three novel immunomodulators of the TME that form protein binding complexes capable of controlling tumor-associated macrophages, which are the major components of the glioblastoma TME. This discovery enabled the design of a new peptide that interacts with the recently discovered immunomodulators to modify the TME to enhance antitumor immune response. Animal experiments revealed that this treatment produced an increase of T cell infiltration and expression of immune checkpoint inhibitors, suggesting the potential of the newly developed peptide to overcome GBM resistance to immunotherapy and synergize with immune checkpoint blockade therapy by combining with other FDA-approved drugs, such as nivolumab or pembrolizumab. This new peptide could give rise to a novel class of drug candidates, including small molecule compounds and therapeutic antibodies, for treating glioblastoma and other types of cancer.	Life Science - Antibody,protein,peptide	Oncology		Hu	Baoli	Med-Computational Biology	In vivo data	Provisional patent application filed	License
Recently Added	5539	Mouse Model of TPI Deficiency	Pitt researchers have come another step closer to treating or curing TPI deficiency with a mouse model of the disease. Created using CRISPR, the model uses the only known homozygous viable human disease-causing mutation. This also enabled the identification of indels that are null mutations. The TPI-deficient mice exhibited reduced TPI protein levels, anemia, progressive locomotor impairment, and markedly reduced longevity, all consistent with a child-onset locomotor disease.	Life Science - Discovery tool	Rare Diseases	Triosephosphate isomerase (TPI) deficiency	Palladino	Michael	Med-Computational Biology	In vivo data	Research Tool	License
Recently Added	5535	Tissue Customized Platelet-Rich Plasma for Optimized Skeletal Muscle, Cartilage, and Bone Healing	In order to make PRP therapy as effective and beneficial as possible, a Pitt researcher has developed a novel approach to customizing PRP to be tissue-specific by eliminating negative/deleterious factors for specific tissue. This tissue-customized PRP will have targeted factors eliminated by neutralizing antibodies that are conjugated using magnetic beads. This technique can easily be added to current PRP isolation protocols, leading to the development of novel approaches to optimize the use of PRP through customization and minimizing potential deleterious effects on the targeted tissue.	Life Science - Cell therapy	Orthopedics	Biologic	Li	Hongshuai	Med-Orthopedic Surgery	In vitro data	Provisional patent application filed	License
Recently Added	5526	Conditional Control of Universal CAR T Cells through Stimulus-Reactive Adaptors	The novel conditional ON-switch systems consist of adaptors with a stimulus-reactive group which serves to block the tag molecule on the adaptor. Without the stimulus, this “caging group” blocks recognition by CAR T cells; with the stimulus, the caging group is removed, allowing recognition by CAR T cells and activating the receptor. The OFF-switches consist of adaptors with a stimulus-reactive chemical cleaving group between the tag and the antibody so that when no stimulus is present the adaptor will activate the CAR T cells but, in the presence of the stimulus, the tag will be cleaved from the adaptor and halt CAR T cell activation. This method offers unprecedented levels of control over CAR T cell activation and deactivation, leading to lower toxicity, improved targeting, improved patient outcomes, and the ability to treat new disease indications.	Life Science - Cell therapy	Platform Technology		Lohmueller	Jason	Immunology	In vitro data	Provisional patent application filed	License
Recently Added	5521	Cytosolic Protein Quality Control Small Molecule Therapeutics	Pitt researchers developed a high-throughput optical screen for such modulators and conducted a pilot screen that successfully identified several compounds of interest. There is a wealth of interest in small molecule PQC modulators of cytosolic proteins that may serve as therapeutic drug targets for diseases characterized by cytosolic protein instability.	Life Science - Small molecule	Rare Diseases	Rare disease	Palladino	Michael	Med-Computational Biology	In vitro data	Provisional patent application filed	License
Recently Added	5520	Therapeutic Targets for TPI Deficiency	In order to identify novel factors that modulate mutant TPI turnover, University of Pittsburgh researchers performed a genome-wide RNAi screen targeting known and predicted quality control proteins. Of more than 400 proteins screened, 25 regulators of TPI were identified, ten of which were novel and previously undescribed. These ten proteins are also conserved in mice and humans, making them more likely to be effective drug targets than other more promiscuous proteins. The proteins identified by this study may reveal novel pathways and drug targets to block degradation of functional, cytosolic proteins, and represent important therapeutic targets for drug development for TPI deficiency and other devastating diseases.	Life Science - Other	Rare Diseases	Rare disease	Palladino	Michael	Med-Computational Biology	In vivo data	Provisional patent application filed	License
	5496	Driving Oxidative Metabolism in Therapeutic T Cells with Overexpression of AMPK	Cultured T cells that are capable of performing oxidative metabolism are more fit for the metabolic conditions they will encounter in vivo, and promoting oxidative metabolism has been shown to increase their in vivo persistence. Oxidative metabolism is also inversely correlated with how differentiated a cell becomes, and a major goal has been to make effector cells both less differentiated and more oxidative before transfer into recipients.Increasing the cellular energy sensor AMP-activated protein kinase (AMPK) is expected to increase the oxidative metabolism of a T cell, leading to an increase in both its stability and suppressive capabilities. By overexpressing the regulatory component of the AMPK heterotrimeric complex via lentiviral transduction of primary human T cells, Pitt researchers propose to modulate AMPK activity and thereby improve the efficacy of multiple therapeutic interventions dependent upon T cells.	Life Science - Cell therapy	Oncology		Byersdorfer	Craig	Med-Pediatrics	In vitro data	Provisional patent application filed	License
	5491	Odansetron for Treatment of Acute Kidney Injury	Using electronic medical records (EMR) from more than twenty thousand AKI patients in ICU stays, researchers identified a novel indication for odansetron, an antiemetic drugused to prevent nausea caused by chemotherapy, in preventing deathof patients with AKI. The molecular mechanism of odansetron suggests that it can down-regulate AKI related genes. Odansetron’s beneficial effects on recovery from acute injury have never been reported before.	Life Science - Small molecule	Critical Care		Wang	LiRong	Pharm-Pharmaceutical Science	Retrospective clinical data	Provisional patent application filed	License
Recently Added	5469	Fully Human Antibodies Targeting Membrane Proximal Region in Human CEACAM5	Since existing CEACAM5 antibodies lack specificity and have unclear epitopes, making them poor candidates for cancer therapy, Pitt inventors identified the first fully human monoclonal antibodies binding to membraneproximal domain of CEACAM5 from large phage display libraries. One antibody, with a well-defined epitope and affinity in the nanomolar range, exhibited specific binding of CEACAM5 without any cross-reactivity to either membrane-distal domains of CECAM5 or >5,800 human surface proteins, suggesting the highest specificity of any reported CEACAM5 antibodies. This antibody demonstrated promising cancer cell specific killing ability without offtarget toxicity in vitro, overcoming limitations of existing antibodies, and indicating its potential as a first-in-class drug for CEACAM5-positive cancers including NEPC.	Life Science - Antibody,protein,peptide	Oncology	Antibody	Dimitrov	Dimiter	Med-Medicine	In vitro data	Provisional patent application filed	License
	5450	RNF167 and CASTOR1 as novel mTOR targets	Low CASTOR1 expression is a poor prognosis marker for ten types of cancer, while high expression of the RNF167, a ligase that targets CASTOR1 for degradation, has been identified as a poor prognosis marker for five types of cancer. Researchers also demonstrated that AKT and RNF167-mediated CASTOR1 degradation activates mTORC1 and promotes breast cancer progression. AKT-mediated phosphorylation of CASTOR1 significantly increases its binding to RNF167, revealing a novel mTORC1 regulating mechanism and potential new therapeutic targets for mTORC1-dysregulated diseases.	Life Science - Small molecule	Oncology		Gao	Shou-Jiang	Med-Microbiology and Molecular Genetics	In vitro data	Provisional patent application filed	License
	5448	Stimulation of Angiogenesis with miRNA as Protection Against Acute Kidney Injury	One of the hallmarks of AKI is damage to renal microvasculature, which alters endothelial function and contributes to hypoxic and inflammatory injury to the renal parenchyma. In AKI, some miRNAs appear to act pathogenically by promoting inflammation, apoptosis, and fibrosis, while others may confer protective benefits. Researchers have obtained preliminary data indicating that the absence of the miR-17~92 cluster makes cells are more susceptible to renal ischemia-reperfusion injury while miR-18a and miR-19b protects against renal IRI, providing evidence for a potential novel therapeutic approach for the treatment of acute kidney injury.	Life Science - Other	Nephrology		Lucas	Sunder	Med-Pediarics	In vivo data in mice using mimics	Provisional patent application filed	License
Recently Added	5427	Mice Physiologically Expressing Human ACE2 for SARS-CoV-2 Vaccine Development	SARS-CoV-2 enters a cell using human ACE2 receptors. While a mouse exists that expresses human ACE2, its expression levels and locations are considerably different from ours and fail to adequately reproduce human infection. Researchers at the University of Pittsburgh have developed a mouse model that expresses human ACE2 in proper locations and amounts using CRISPR/Cas9 technology to “knock-in” a gene cassette at the mouse Ace2 start codon. These transgenic mice can be immunized with candidate vaccines, challenged with wildtype SARS-CoV-2 virus, and observed for pathogenicity and clinical signs. These mice are also ideal for in vivo drug testing, laying the foundation for critical life-saving research.	Life Science - Research Tool	Infectious Disease		Shlomchik	Mark	Immunology	In vivo data	Non-patented bio research tool available for licensing	License

	5404	Insertion Unique to SARS-CoV-2 Exhibits Superantigenic Characteristics	Using structure-based computational models, researchers have demonstrated that the SARS-CoV-2 spike harbors a sequence motif unique to SARS-CoV-2 and not present in other SARS coronaviruses, which is highly similar in both sequence and structure to bacterial superantigens. Further examination suggested that the SARS-CoV-2 spike may act as a superantigen that drives the development of MIS-C as well as the cytokine storm in adult COVID-19 patients. Potential development strategies include preparing a decoy peptide that can bind to the site in the viral structure and prevent it from binding to T cell receptors or preparing a monoclonal antibody specific to the viral superantigenic binding site and thus block the interaction with the T cell receptor.	Life Science - Antibody,protein,peptide	Infectious Disease		Bahar	Ivet	Med-Computational and Systems Biology	Design; candidate antibodies identified	Provisional patent application filed	License
	5391	Versatile, Multivalent Nanobody Cocktails Efficiently Neutralize SARS-CoV-2	Researchers have recently identified thousands of potent SARS-CoV-2 neutralizing nanobodies by *in vivo* (camelid) antibody affinity maturation followed by advanced proteomic identification. Multiple elite Nbs with up to femtomolar affinities—the highest known in nature—inhibit viral infection at sub-ng/ml concentration, more potent than some of the best human neutralizing antibodies and hundreds to tens of thousands of times more potent than other available neutralizing Nbs. A crystal structure of such an elite neutralizing Nb in complex with RBD has been determined, and structural proteomics and integrative modeling reveal multiple distinct and non-overlapping epitopes and indicate an array of potential neutralization mechanisms. Structural characterization facilitated the bioengineering of novel multivalent Nb constructs into multi-epitope cocktails that achieved ultrahigh neutralization potency, with IC50s as low as 0.058 ng/ml—the most potent biotherapeutics to date—and may prevent mutational escape. Our thermostable Nb cocktails can be rapidly produced in bulk from microbes and resist lyophilization and aerosolization. These promising agents are now being translated into efficient, cost-effective, and convenient therapeutics to help end this health crisis.	Life Science - Antibody,protein,peptide	Infectious Disease	Biologic	Shi	Yi	Med-Cell Biology	Finished preclinical studies with hamster model	Provisional patent application filed	License
	5390	Small Molecule Inhibitor Therapy to Prevent Aneurysm Formation, Growth, and Rupture	New research shows that small molecule inhibitors targeting the platelet-driven CXCL7-CXCR1/2 inflammatory pathway can be used to prevent cerebral aneurysm formation and rupture. This approach may be able to be used to develop a pharmacological treatment of unruptured and coiled aneurysms, enabling a superior healing response and avoiding the risks inherent in open surgery.	Life Science - Small molecule	Neuroscience	Small molecule	Friedlander	Robert	Med-Neurological Surgery	In vivo data, including cytokine arrays and ELISA data from a hypertensive mouse model of intracranial aneurysm formation; electron microscopy of aneurysm samples, cytokine arrays of aneurysm samples, and blood samples from human patients with aneurysms, and in silico computational data for pathway discovery from the above cytokine arrays.	Provisional patent application filed	License
	5379	Drugs repurposed for COVID-19	Researchers at the University of Pittsburgh have applied state-of-the-art bioinformatic tools to identify drugs previously approved by the FDA that may be effective in treating SARS-CoV-2 infection. Based on network topology and controllability, eight drug targets have been prioritized, of which two have yet to be explored. Compounds targeting these genes are suggested for viral inhibition study.	Life Science - Generics,Biosimilar	Infectious Disease	Small molecule	Shoemaker	Jason	Chem/Petroleum Engineering	Concept	Provisional patent application filed	License
	5372	HDAC Inhibitors as Anticancer Agents	University of Pittsburgh researchers have developed a series of chromane-based hydroxamic acids that have been demonstrated to be potent and selective HDAC inhibitors with potential use as novel anticancer and anti-neurodegenerative agents.	Life Science - Small molecule	Central Nervous System		Wipf	Peter	Chemistry	In vitro data	Provisional patent application filed	License
	5348	Prodrug-based amphiphilic polymer (PASA)	Researchers have developed a prodrug-based amphiphilic polymer (PASA) with COX inhibiting pharmacological properties. PASA self-assembles to forma small-sized nanocarrier that is highly effective in loading doxorubicin (DOX) and capable of codelivery of both the COX inhibitor and chemotherapeutic agent together. PASA has an unprecedentedly high DOX loading capacity and has been shown to be highly effective in targeting to and inhibiting the growth of murine tumors and successfully achieves COX inhibition at much lower concentrations. Moreover, combination of PASA/DOX with anti-PD-1 antibody leads to drastic improvement, including complete regression of some established tumors, even at suboptimal doses of PASA/DOX. This has the potential to represent a new and effective immunochemotherapy for various types of cancer.	Life Science - Drug delivery	Oncology	Drug delivery	Li	Song	Pharm-Pharmaceutical Science	In vivo data	Provisional patent application filed	License
	5326	SARS-CoV-2 Recombinant Adenovector Vaccine	The spike (S) protein on the envelope of SARS-CoV-2 and other coronaviruses has been identified as a mediator of viral entry into a host cell, and it has been demonstrated that antibodies targeting the S protein can block the binding of these viruses to the cell receptor. Further, targeting the S1 subunit of the S protein generates a more efficacious neutralizing antibody response than targeting the full-length S protein in addition to reducing the potential risk of antibody-dependent enhancement observed with some vaccine candidates that targeted the entire S protein. Pitt researchers have constructed and evaluated a recombinant adenoviral vector encoding the transgene for the antigen SARS-CoV-2 S1 for COVID-19 which elicits a potent and specific IgG antibody response as early as two weeks after vaccination. They have also discovered that intranasal vaccine delivery generates significantly higher antigen-specific IgG levels and neutralizing activity compared to subcutaneous vaccine injection. This new adenovirus vaccine and its associated intranasal delivery mechanism display promising immunogenicity, making it an appealing candidate against this and other emerging coronavirus diseases.	Life Science - Vaccine	Vaccines		Gambotto	Andrea	Med-Surgery	In vivo data	Provisional patent application filed	License
	5317	A Novel Neoplastic Fusion Transcript Predicts Sensitivity to the MEK Inhibitor Trametinib in More Aggressive and Metastatic Breast Cancers	Researchers at University of Pittsburgh have discovered a non-traditional molecular event underlying molecular pathobiology of more aggressive and metastatic breast cancer. In this study, a large-scale analysis of breast cancer transcriptome revealed a tumor-specific fusion transcript that is preferentially overexpressed in luminal B and metastatic breast cancers and has been shown to increase aggressiveness of luminal breast cancer cells. This fusion also appears to activate a chain of signaling proteins that play a critical role for cancer cell to disseminate and colonize distant organs. To date, this fusion remains the most frequently expressed tumor-specific fusion transcript reported in luminal breast tumors. Importantly, breast cancer cells overexpressing this fusion transcript show markedly increased sensitivity to trametinib, the first FDA approved oral MEK inhibitor used for treating melanoma. This discovery suggests a new paradigm that non-traditional molecular events may be accountable for more aggressive and metastatic breast cancers and are a promising target for treating these deadly tumors.	Life Science - Antibody,protein,peptide	Oncology		Wang	Xiaosong	Med-Pathology	In vitro data	Provisional patent application filed	License
	5298	ImmunoPET imaging of CD107a	A promising option to improve diagnostic imaging is immunoPET, which combines the high sensitivity and quantitative capabilities of positron emission tomography (PET) with the specificity and selectivity of monoclonal antibodies (mAb) against a given tumor cell surface marker. Targeting the cell surface marker CD107a, a marker of CD8+ T-cell degranulation and natural killer (NK) cell functional activity,with immunoPET probes can quantify the extent of T-cell mediated cytotoxic action, which directly correlates to immunotherapy.This technique serves as a novel diagnostic, a means of measuring immunotherapeutic response to treatment, and a non-invasive therapy. ImmunoPET imaging with CD107a mAbs represents a move away from a one-medicine-fits-all trial-and-error approach to treating cancer to offering the right treatment, for the right patient, at the right time, providing a more targeted, personalized, and efficient therapy.	Life Science - Molecular diagnostic	Oncology		Edwards	Wilson	Med-Radiology	In vivo data	Provisional patent application filed	License
	5290	Profilin1-actin interaction inhibitor as a Novel Anti-Angiogenic Compound	Profilin1-actin interaction is critical for actin-driven biological processes; specifically, angiogenesis, which drives ccRCC in addition to other pathologies including proliferative diabetic retinopathy, wet age-related macular degeneration, and other types of cancer. Targeting Profilin1 instead of VEGF is an alternative strategy to treating these diseases without developing the spontaneous or acquired resistance seen in anti-VEGF approaches. Proof-of-concept studies have demonstrated that inhibiting the Profilin1-actin interaction reduces proliferation and migration of RCC tumor cells and may also prove useful as a prognostic biomarker.	Life Science - Small molecule	Platform Technology		Roy	Partha	Bioengineering	In vivo data; SAR studies of commercially available structural analogs underway	Provisional patent application filed	License
	5288	A New Therapeutic and Diagnostic Target for SARS-CoV-2 and COVID-19	Prior research in a University of Pittsburgh laboratory had focused on investigating the pathobiology of endothelial cell nuclear receptor coactivator 7 (NCOA7). NCOA7 has been shown to regulate immunoactivation of the endothelium and subsequent leukocyte adhesion, leading to presumable viral infiltration. NCOA7 accomplishes this by altering lysosomal acidification, a process that has been independently found to affect entry of other enveloped viruses such as the similarly-structured influenza virus. Researchers have also identified an allele-specific mechanism that may influence NCOA7 expression and cellular susceptibility to infection. This invention includes the development of small molecules, gene therapy systems, RNAi-based systems, or the use of certain inhibitors to control NCOA7 expression to prevent or improve infection in addition to the use of NCOA7 SNP genotyping as a means of individual risk of infection and disease severity in order to prevent infection or complications. NCOA7 may prove to be immediately relevant for development of new drugs and repurposing of old drugs for therapies for this new pandemic.	Life Science - Other	Infectious Disease		Chan	Stephen	Med-Medicine	In vitro testing of predicted compounds in cultured human cells	Provisional patent application filed	License
Recently Added	5287	Fibroblast Growth Factor 7 Peptide	Researchers developed a small peptide derivative of HrFGF7 (FGF7-p) that is easily and directly synthesized at the University of Pittsburgh Peptide Synthesis Core. In a preclinical cyclophosphamide mouse bladder injury model, FGF7 p is as effective as the parent HrFGF7 in blocking urothelial cell apoptosis when used at 4-times the dose as HrFGF7. Both FGF7-p and HrFGF7 activate identical downstream signaling pathways, including FRS2α and AKT, to drive the cell protective effects. This strongly suggests that FGF7-p can work as an effective alternative to full-length HrFGF7. The small peptide is much easier and significantly less expensive to produce and avoids the need for recombinant protein production. Adoption of FGF7-p could lead to drastically reduced costs for preclinical and clinical studies and ultimately for clinical use of this versatile and valuable cell protectant.	Life Science - Clinical development tool			Bates	Carlton	Med-Pediatrics	In vivo data	Provisional patent application filed	License
Recently Added	5259	Human Monoclonal Antibodies against SARS-CoV-2	Pitt researchers have developed neutralizing human mAbs that specifically target the SARS-CoV-2 RBD using large phage displayed antibody libraries for use in preventing and treating SARS-CoV-2. Two high-affinity binders neutralized the virus by competing with ACE2 for binding with the receptor. One other high-affinity binder did not compete significantly with ACE2, but could induce antibody-dependent cellular cytotoxicity (ADCC), killing infected cells. To our knowledge, these were the first human mAbs that can bind to the RBD and neutralize the virus.	Life Science - Antibody,protein,peptide	Infectious Disease	Antibody	Dimitrov	Dimiter	Med-Medicine	In vitro data	Dimitrov DS, Chen C, Jelev DV, Mellors JW, Li W, Sun Z. Molecules that Bind to SARS-CoV-2. US 10,822,379. Issued 03 Nov 2020.	License
	5236	Substituted Indoles with activity to treat Acute Kidney Injury	Using a proliferation-based phenotypic assay in zebrafish, researchers have discovered a class of compounds which selectively inhibit HDAC and enhances recovery from acute kidney injury when given days after the initial injury.	Life Science - Small molecule	Nephrology		Huryn	Donna	Pharm-Pharmaceutical Science	In vivo data in zebrafish	Provisional patent application filed	License

	5224	RNA- and DNA-Based Assays for Predicting Paclitaxel Resistance in Triple Negative Breast Cancer	While the complexity of genomic rearrangements in this cancer has obscured the role that gene fusions play in the pathology of TNBC, researchers at the University of Pittsburgh identified 99 recurrent gene fusions, 57% of which are cryptic adjacent gene rearrangements (AGRs). The most frequently occurring AGRs were preferentially found in the more aggressive forms of breast cancers that lacked well-defined genetic targets; one was found exclusively in TNBC and TNBC tumors with this fusion gene exhibited aggressive histopathological features such as gross necrosis and high tumor grade. This fusion gene was also shown to endow resistance to paclitaxel treatment. RNA- and DNA-based assays for this gene fusion can be used to predict paclitaxel resistance in triple negative breast cancer and allow treatment providers to quickly pivot to alternative treatment options, sparing the patient from the unnecessary and unpleasant side effects of chemotherapy, in addition to serving as a target for novel therapeutics.	Life Science - Other diagnostic	Oncology		Wang	Xiaosong	Med-Pathology	In vitro data	Provisional patent application filed	License
Recently Added	5170	Fully Human Anti-Mesothelin Engineered Antibody VH Domains	Due to its remarkable success in treating B cell malignancies, CAR-T cell therapy has become a potential strategy for treating MSLN-expressing tumors. Safety issues, adverse events, and tolerated dose of MSLN-targeting CAR-T cell therapy are currently being evaluated in multiple phase I and II clinical trials. University of Pittsburgh researchers have identified a panel of 12 fully human single-VH domains for use in CAR-T cell therapy against MSLN-expressing tumors, which are expected to have less immunogenicity than those currently in clinical trials. The small size of these engineered antibody domains (eAds) could contribute to better penetration efficiency and broader applicability than previous antibody therapies, with the additional ability to target cryptic epitopes that are otherwise occluded by full-length antibodies and with enhanced access to some epitopes and expression.	Life Science - Antibody,protein,peptide	Oncology	Antibody	Dimitrov	Dimiter	Med-Medicine	In vitro data	Provisional patent application filed	License
	5150	Intrapancreatic M2 Polarization of Macrophages to Reverse Type 1 Diabetes	While previous research has showcased the ability to reprogram pancreatic alpha cells into functioning beta-like cells and normalize blood glucose in non-obese diabetes mice, these mice eventually developed diabetes due to autoimmune recognition of the newly formed beta cells; clearly, effective autoimmune suppression is a crucial part of lasting treatment. A recently developed gene therapy approach is able to induce pancreatic macrophages from the M1 subtype to the M2 anti-autoimmune subtype in vivo using a novel surgical procedure called pancreatic intraductal infusion. By cannulating the pancreatic duct, an AAV viral vector carrying the TIPE2 transgene under a macrophage-specific promoter can be introduced, inducing M2 polarization of pancreatic macrophages and suppressing the autoimmune reaction that destroys beta cells. Combined AAVs that reprogram alpha cells into beta cells and that polarize M2 macrophages dually reverse diabetes in autoimmune NOD mice, with determined mechanisms. Both the surgical technique and gene delivery mechanism are similar to routine techniques called endoscopic retrograde cholangiopancreatography in human. This proposed strategy represents a comprehensive, clinically translatable method to treat T1D patients, and will be tested in non-human primates before application for a clinical trial.	Life Science - Gene therapy	Metabolic Disease		Xiao	Xiangwei	Med-Surgery	In vivo data	Provisional patent application filed	License
	5144	Software for De-Identifying Medical Narrative Documents	De-ID is just such a system; inputting an ascii file containing free-text medical reportsyieldsa file that contains a de-identified version of the report. De-ID is used at the University of Pittsburgh and other research universities across the country to remove identifying information such as patient name, address, or relevant dates. Recent additions to the software have improved functionality by allowing for batch processing of files, allowing the program to be called by another, and improved heuristics for finding and removing the protected health information. Additional user-controlled features, such as customizing the amount, direction, and units of date offset, have improved usability for researchers. De-ID represents a simple, effective way to anonymize enormous sets of patient data, guarantee HIPAA compliance, and protect patients' privacy.	Life Science - Software - Non-clinical	Other		Saul	Melissa	Med-Biomedical Informatics	Software	Copyright	NewCo
	5099	Trabecular Meshwork Stem Cell Secretome for Treatment of Glaucoma	The secretome derived from trabecular meshwork stem cells (TMSCs) has been found to reduce IOP in two glaucoma mouse models of steroid-induced and inherited glaucoma. Treatment with secretomeby periocular injectionleadsto dramatic IOP reduction to a normal range for up to two months,as well as improved retina function similar to normal animals. Secretome reduced fibrosis in wounded TM cells, increased TM cells'wound healing capacity, and protected retinal ganglion cell from death. The safety evaluation did not indicate any side effects with secretome treatment.	Life Science - Cell therapy	Ophthalmology	Biologic	Du	Yiqin	Med-Ophthalmology	In vitro and in vivo data; xenograft experiments have been completed with very promising results	Provisional patent application filed	License
	5090	Novel Therapies to Treat Wet and Dry AMD	Researchers have made several important discoveries in the quest for an effective AMD treatment, among them that neutrophils, which play a role in innate immune response, invade theretina in the early stages of AMD, implicating them in the development and progression of the disease. Inhibiting a particular signaling pathway reduced homing of neutrophils to the retinaand alleviated early symptoms of AMD. This treatment has broad implications beyond AMD, and can be used inother disorders such as diabetic retinopathy, diabetic macular edema, and neurodegenerative diseases like Alzheimer's and Parkinson's disease. Gene therapy may be key to preventing, treating, or even reversing progressive blindness in the elderlyand treating eye disorders in the broader population.	Life Science - Gene therapy	Ophthalmology		Sinha	Debasish	Med-Ophthalmology	In vitro data; planned animal models of AMD	Hose S, Ghosh S, Stepicheva NA, Byrne L, Sinha D. Treatment Methods for Eye Disorders. WO 2021/050744. World Intellectual Property Organization. Patent application published on March 18, 2021.	License
	5084	Lung Targeting Peptide to Deliver Diagnostic and Therapeutic Cargoes to the Lung	Building on previously synthesized cell-penetrating peptides, researchers at the University of Pittsburgh developed two new peptidesthat displayed up to five timesgreater transduction activity compared to its predecessorsin vitro. Interestingly, thesepeptides showrobust uptake in lung tissue and epithelial cells lining the alveoli far in excess of the heart—the expected target—and in excess of any uptake of the original peptide. Delivered via injection, thesecell-penetrating peptides haveprevioulsydemonstrated their capacity to act as vectors for delivery of genes, siRNA, anti-sense oligonucleotides, peptides, proteins, nanoparticles, viral particles, and radioisotopes. These novel synthetic peptides presenta wealth of new opportunities for drug delivery to thelungs via peripheral injection, sidestepping the mechanical and immunological barriers that have thus far prevented efficient pulmonary drug administration.	Life Science - Drug delivery	Respiratory		Zahid	Maliha	Med-Developmental Biology	In vivo data using a chemical model of COPD	Provisional patent application filed	License
	5075	Upregulation of NMDA Receptor Function by a GluN2A/ZnT1-directed Peptide	Researchers designed a cell and blood-brain-barrier permeable peptide termed TAT-N2AZ aimed at disrupting the ZnT1-GluN2A interaction. They observed that in the presence of the peptide, but not a control scramble, NMDA receptor activation was enhanced by decreasing the inhibitory actions of synaptically-released zinc. This is the first tool developed to enhance NMDA receptor function via a previous undescribed mechanism and may be useful in the treatment of disorders associated with NMDA receptor hypofunction,such as schizophrenia.	Life Science - Antibody,protein,peptide	Neuroscience		Aizenman	Elias	Med-Neurobiology	In vitro data	Provisional patent application number 62/942,979 filed.	License
Recently Added	5071	Oncolytic Vaccinia Virus Delivering Tethered IL-12 Enhances Antitumor Effects with Improved Safety	Pitt researchers constructed an oncolytic vaccinia virus that encodes membrane-tethered IL-12 and tested if it could turn a cold tumor into hot tumor while avoiding the systemic toxicity of IL-12. Virus-delivered IL-12 was shown to have greatly reduced toxicity, while retaining its potent capability of eliciting an antitumor immune response. The treatment facilitated the transformation of a cold tumor to a hot tumor and improved survival. Combined with PD-1 blockade, it induced potent antitumor effects in multiple tumor models. Impressive trials in mice suggest immediate translatability to clinical settings.	Life Science - Drug delivery	Oncology	Immuno-oncology	Bartlett	David	Med-Surgery	In vivo data	US and PCT patent applications filed	License
	5061	Peripheral Nerve Agonists to Suppress Inflammation	Based on a discovery that neurons that promote painful sensationsandalso drive inflammation in the skin, researchers at the University of Pittsburgh determined that a specific subset of neurons that innervate the epidermis as well as the intestine are required to suppress the activation of inflammation-causing mast cells. This unique group of neurons express aprotein which, when treated with its corresponding small-molecule agonist, suppresses cutaneous mast cell function. This discovery indicates that small-molecule agonists of this neuron typecould be used to suppress mast cell activation without inducing global immune suppression, fulfilling an as-yet unmet therapeutic need.	Life Science - Small molecule	Other	Small molecule	Kaplan	Daniel	Med-Dermatology	In vivo data including in mouse models of human rosacea, atopic dermatitis, general dermatitis, urticaria, and psoriasis	Provisional patent application filed	License
	5010	SCUBE1 as a novel therapeutic target and clinical marker for therapy, diagnosis and outcome prediction of pulmonary	SCUBE1 gene has been shown to modulate pulmonary endothelial angiogenic potential, proliferation, and apoptosis. In PAH animal models and patients, SCUBE1 levels are decreased and negatively correlate with disease severity and progression, indicating its potential usefulness as a therapeutic target. By modulating pathogenic endothelial dysfunction and serving as a circulatory plasma marker for diagnosis of PAH, SCUBE1 could prove incredibly useful as a therapeutic target and for monitoring severity and progression of the disease.	Life Science - Other	Respiratory		Chan	Stephen	Med-Medicine	In vivo data	Provisional and PCT applications filed	License
Recently Added	4989	T Cell Receptors Targeting Mutations in RNA Splicing Factors	Pitt researchers isolated genes encoding two unique T cell receptors (TCRs) capable of recognizing peptide epitopes from a mutated RNA splicing factor commonly found in uveal melanoma, chronic lymphocytic leukemia, myelodysplastic syndromes, and breast cancer. When these genes were introduced into a donor T cell, mutation reactivity was conferred without eliciting reactivity against the non-mutated form of the protein. Cancer patients with similar mutations stand to benefit greatly from personalized immunotherapy focused on genetically engineering human T cells with TCRs targeted to this mutated RNA splicing factor.	Life Science - TCRs,proteins,peptides	Oncology	Immuno-oncology	Kammula	Udai	Med-Surgery	In vitro data	PCT patent application filed	License
Recently Added	4988	T Cell Receptors Targeting Defective DNA Repair Proteins	Pitt researchers have isolated genes encoding two unique T cell receptors (TCRs) capable of recognizing peptide epitopes from mutated proteins found in many cancers. When introduced into a donor T cell, these genes conferred their respective mutation reactivity without conferring reactivity against nonmutated forms of the proteins. Cancer patients with similar mutations in their DNA repair proteins may benefit from genetic engineering of human T cells to express the unique TCRs, making it an attractive new targeted immunotherapy option.	Life Science - TCRs,proteins,peptides	Oncology	Immuno-oncology	Kammula	Udai	Med-Surgery	In vitro data	PCT patent application filed	License
	4976	Championing Hearing Using Accessible Medication Experts at the Pharmacy Counter: CHAMP Online Certificate Program	CHAMP is a self-paced online learning program run on the CANVAS Learning Management System (LMS) platform via the University of Pittsburgh Center for Teaching and Learning. The contents are covered in 10 modules for a total of 4 hours of accredited pharmacy continuing education. The competencies addressed in the modules were determined by a panel of experts representing national organizations of pharmacists, audiologists, and people with hearing loss, as well as OTC hearing device manufacturers. CHAMP provides pharmacist education about hearing loss and hearing aids with a focus on patients versus products.	Life Science - Other	Otolaryngology		Berenbrok	Lucas	Pharm-Pharmacy and Therapeutics	Consulted with over 40 individuals in customer discovery, including pharmacists, people with hearing loss, hearing aid users, OTC hearing aid manufacturers, and audiologists; landing page has been designed and learning content is under development.	Copyright	NewCo
	4942	Patient Experience Navigator (PENY)	Our solution is PENY, a patient experience navigator for real-time patient experience analytics. PENY is an app that the patient uses to rate and review all aspects of their experience during the hospital stay. It collects more detailed information than HCAHPS, aggregating information regarding pain, mood, boredom, food, environment, healthcare professionals, and treatment. Additionally, the app can be modified or gamified to appeal to and receive feedback from children. The application analyzes the data in real time, providing immediate feedback that allows healthcare providers to implement changes that lead to better patient outcomes, especially for those with chronic conditions that are in the hospital for an extended duration. Enacting these data-driven changes will also lead to improvements in hospital ratings and an increase in hospital reimbursement.	Life Science - Software - Non-clinical	Other	Healthcare IT	Roy	Eva	Med-Critical Care Medicine	App development and pilot study	Copyright	NewCo

	4936	SToPVTE: Screening to Prevent Venous Thromboembolism	Our product is anelectronic health record (EHR)-embedded CDSSthat uses existing patient data in real-time to recommend individualized thromboprophylaxis measures based on the most up-to-date assessment of a patient's risk. Unlike other risk assessment instruments, our tool will predict time and type of VTE (i.e., deep vein thrombosis or pulmonary embolus) and generate recommendations for the dose, duration, and type of prophylaxis. In contrast to existing CDSS applications, our product will be compatible with multiple EHR platforms, use patient data in real-time, and automate the decision-making process for prophylaxis. Finally, SToPVTE is a sustainable solution: it captures outcome data for ongoing improvement of risk calculation and interventions to save lives.	Life Science - Software - Clinical	Hematology	Machine learning	Neal	Matthew	Med-Surgery	Preliminary data has provided validation of concept. Development of machine learning algorithm is underway in a partnership with UPMC Clinical Analytics and University of Pittsburgh Department of Biomedical Informatics.	Copyright	NewCo
	4927	ChargeOR: Optimized Scheduling and Communication in the Perioperative Period	ChargeOR is the firstweb and mobile app specifically designed by anesthesiologists for use in the perioperative period to allow maximum efficiency for case and staff scheduling and communication.Our app integrates with existing electronic medical records systems to allow for an all-inclusive scheduling program to increasethe number ofcases completed and facilitate integration of emergencicesinto the OR schedule.Teams of providers can be set up to enable scheduling and communication months, weeks, or days in advance with real time case tracking and data analytics.	Life Science - Software - Non-clinical	Surgery	Healthcare IT	Lebovitz	Evan	Med-Anesthesiology	Beta version; trial planned for use at UPMC Mercy Hospital	Copyright	NewCo
Recently Added	4890	Human Antibody Domains and Fragments to CD276	Rather than targeting viral proteins, Pitt researchers aim to exploit the natural antiviral programs that arm host cells and used a comprehensive, mechanism-unbiased, and highly integrated systems-level approach. A set of 38 priority candidate compounds targeting the host system, including repurposable and computational drugs, were identified using computational modeling. Fifteen compounds have potential antiviral actions, while 23 have possible anti-hyperinflammatory capabilities. Fourteen have been selected for in vitro assays with different cell lines. Several of these compounds inhibited SARS-CoV-2 infection in a dose-dependent manner, with two showing particular efficacy. These findings expand the repertoire of drugs and compounds that can be repurposed or developed for treating COVID-19 either independently or in combination with each other.	Life Science - Antibody,protein,peptide	Oncology	Antibody	Dimitrov	Dimiter	Med-Medicine	In vitro data	Provisional patent application filed	License
Recently Added	4854	Novel Ticagrelor Coated Coronary Stent Using a Self-Assembled Monolayer Linker System	Researchers at the University of Pittsburgh have invented a novel vascular stent with inherent antiplatelet capabilities, which therefore requires no antiplatelet therapy after implantation. Ticagrelor, an anticoagulant frequently used in systemic antiplatelet therapy, is tethered to the surface of the stainless-steel stent using a chemical linkage with self-assembled monolayers, which prevents disaggregation of ticagrelor from the stent. This targeted approach mitigates bleeding risk associated with use of longer term systemic antiplatelet therapy and has the additional benefit of preventing blood-metal contact. This stent has been tested in rabbit implant studies and demonstrated 100% patency of the stent after 35 days with no systemic antiplatelet therapy.	Life Science - Medical Device	Cardiovascular		Pacella	John	Med-Medicine	in vivo data	PCT/US2020/029832 in prosecution	License
	4771	Diagnostic for Preventing Necrotizing Enterocolitis (NEC)	Bacteria that escapesbinding by maternal antibodies such as IgA has been associated with later development of NEC. We have developed a bacterial array which allows for determination of the anti-bacterial repertoire--the number of different bacteriathat can be bound--of any given breast milk sample. The breadth of IgA specificity for these bacteria as determined by the array will indicate which milk samples are the most effective at preventing NEC, and will allow NICU doctors and donor milk banks to target milk samples to the most at-risk infants. The array is both customizable to customer needs and fast to run with a 24 hour turn-around time. The array can also be repurposed to combat other infant health risks, such as bacteremia and viremia.	Life Science - Other	Pediatrics/Neonatology		Hand	Timothy	GSPH-Human Genetics	Device designed Proof of principle in place Post-hoc clinical trial pending	Provisional patent application filed	NewCo
	4712	CyteSolutions Lens: Drug-Eluting Contact Lens Technology	Developed at the McGowan Institute for Regenerative Medicine in conjunction with clinical experts from the University of Pittsburgh Medical Center's Eye & Ear Institute, the CyteSolutions Lens is a soft lens-based therapy and features use of a low-dose, sustained, locally releasing drug, providing convenient application with a familiar modality and long-term relief of symptoms. The CyteSolutions Lens releases a drug targeting a novel underlying pathway of dry eye inflammation not previously targeted in currently available therapies. Unlike competitors such as Restasis®, Cequa™, Xiidra®, and over the counter tear substitute eye drops, our therapy can be applied infrequently and overnight, with potential to provide days-long relief. Laboratory in-vitro tests have also shown ability of the CyteSolutions Lens to release the active ingredient for days, reducing frequency of treatment and creating longer lasting symptom relief.	Life Science - Drug delivery	Ophthalmology		Nolfi	Alexis	Graduate Studies-Dietrich School of Arts and Sciences	In vivo data	Patent application WO 2020/185689 filed and published. Exploring pathways for separate patents and FDA approval of the lens as a delivery device and the therapeutic itself.	License
Recently Added	4623	PDLIM2 Therapy for Cancer	PDLIM2 is a protein that acts as a tumor suppressor and whose expression is often repressed in various cancers. Repression of PDLIM2 is linked to cancer development, progression, metastasis, and therapy resistance, including complete resistance to anti-PD-1 therapy and epigenetic drugs. University researchers have developed several clinically feasible methods to restore PDLIM2 expression and/or function in tumor and tumor-associated cells, which promotes antitumor activity and synergizes with anti-PD-1 therapy. In combination with chemotherapy and anti-PD-1 therapy, restoration of PDLIM2 has demonstrated complete remission of most animals with lung tumors, establishing a new foundation for PDLIM2-based combination therapies for cancer treatment. Additionally, PDLIM2 expression and function in tumor cells and tumor-associated cells can be used as a marker to assess cancer risk, diagnosis, prognosis and treatment response.	Life Science - Antibody,protein,peptide	Oncology	Protein	Qu	Zhaoxia	Med-Microbiology and Molecular Genetics	In vivo data	PCT patent application filed	License
Recently Added	4566	Oncolytic Viruses Expressing Cytokine IL-36γ for Cancer Therapy	Novel oncolytic vaccinia viruses were constructed to express the secreted form of IL-36γ. The virus infects cancer cells, induces oncolysis, and secretes the cytokine from the infected cancer cells. The addition of IL-36γ enhances the antitumor activities of the oncolytic viruses by promoting an adaptive T cell-mediated immune response and stimulating the immunogenic tumor microenvironment. In models of colon cancer, pancreatic cancer, and melanoma, direct injection of the armed virus led to superior antitumor effects.	Life Science - Drug delivery	Oncology	Immuno-oncology	Sheng Guo	Zongsheng	Med-Surgery	In vivo data	US and PCT patent applications filed	License
	4538	PACT: Perception-Action Coupling Task	PACT is a software application that assessesthe ability of an individual to respond in a timely and appropriate manner. PACT detects when individuals are at greater risk of making a sleep loss-related error that could compromise productivity and safety. Further, PACT will be used to generate fatigue risk identification and prediction algorithms that provide behaviorally-relevant and actionable information to employers, allowing them to implement countermeasures to mitigate fatigue risk performance decrements.	Life Science - Software - Clinical	Neuroscience		Connaboy	Christopher	SHRS-Dept of Sports Medicine and Nutr	First generation software application	Nearing finalization of inter-institutional agreement (Pitt & Houston) prior to forming and launching an LLC	NewCo
	4518	Targeting Highly Tumor-Specific Long Non-Coding RNAs for Cancer Diagnosis, Prognosis and Therapy	Investigators at the University of Pittsburgh have identified a group of cancer-related lncRNAs as novel biomarkers of cancer. In addition, they developed methods of detecting and inhibiting these molecules in cancer cells. Researchers paired the detection of these lncRNAs with genetic and clinical data from 1,023 breast tumor samples and 24 breast cancer cell lines. By integrating the lncRNA profile with clinical outcome data, investigators have concluded that these lncRNAs are important players of tumorigenesis and clinical prognosis. Among the 2,123 lncRNAs identified, one in particular appears to have higher expression in nine different cancer types including breast cancer. Inhibition of these lncRNA in breast cancer cells led to cell death, suggesting therapeutic potential in treating breast cancer.	Life Science - Antisense,RNA	Oncology		Yang	Da	Pharm-Pharmaceutical Science	In vitro data	Yang D, Wang Z. Targeting Cancer-Associated Long Non-Coding RNAs. WO 2019/165212. United States Patent and Trademark Office. Patent application published 29 August 2019.	License
	4479	Vital-Dent: A Revitalizing Root Canal Solution	Vital-Dent™ is a revitalizing root canal implant for RCT-treated teeth. It consists of a naturally-derived biomaterial and achemotactic factor which promote migration of progenitor cells from the peri-apical space into the tooth, stimulateangiogenesis and neurogenesis into the tooth, and fostera pro-remodeling immune response to facilitate these. Similar to conventional RCT fillers, Vital-DentTMis inserted into the canal space, producing vital tissue in the tooth canal that guards against bacterial invasion and tooth injury by restoring sensation, intra-pupal pressure, and immune responsiveness. Compared to conventional RCT, Vital-DentTMwill reduce clinical time, number of procedures, and total care cost. Vital-DentTMis an attractive alternate for younger patients seeking to maintain their teeth, and for practitioners wishing to distinguish their practice.	Life Science - Medical Device	Dental		Taboas	Juan	Dent Med-Endodontics	In vitro proof of concept, pilot in vivo test and refinement of prototype	Published US non-provisional application US-2020-0405916-A1, as well as applications in Europe and Japan.	NewCo
	4461	NKCC Inhibitors for Neuroprotection following a Stroke	To overcome the limitations of bumetanide as a stroke treatment,researchers havedeveloped lipophilic and uncharged bumetanide derivatives thatpenetrate thebloodâbrain barrier more easily. Changes to the structure of the bumetanide molecule could also curb diuresis by conferring greater selectivity for NKCC1 —which is primarily expressed in the brain —over NKCC2 in the kidney. In a mouse model of stroke, one of the new compounds, STS66, was more effective than bumetanide at reducing cell death, swelling, and neurological deficitsin the weeks after the ischemic event. The mice receiving STS66 even lived longer.	Life Science - Small molecule	Neuroscience		Mon	Dandan	Pharm-Pharmaceutical Science	In vivo data	Erker T, Schreppel P, Sun D. Bumetanide Derivatives for the Therapy of Stroke and Other Neurological Diseases/Disorders Involving NKCCs. WO 2019/193161. World Intellectual Property Organization. Patent application published 10 October 2019.	License
	4453	A Novel Multifunctional Drug Delivery System for Chemo-Gene Combination Therapy	The present invention is a novel micellar system composed of cationic amphiphilic polymers for co-delivery of small molecule chemotherapy drugs and therapeutic genes. Researchers at the University of Pittsburgh have developed novel polymeric carriers composed of PEG hydrophilic segments and cationic moieties. These polymers have the ability to form micelles, which can effectively load hydrophobic drugs while simultaneously forming complexes with nucleic acids. When co-loaded with a drug and plasmid DNA, these micelles are observed to be significantly smaller and more stable than particles loaded with the drug alone. In this system, the multivalent charge–charge interactions between the cationic polymer and plasmid DNA serve as a simple approach to cross-link the micelles, thus making these micelles more stable than free micelles or micelles loaded with small molecule alone. As a working example, investigators developed a polymer for co-delivery of IL-36γ expression plasmid and doxorubicin (Dox) to lung metastasis of breast cancer. The use of this polymer resulted in significantly higher gene transfection in both lungs and tumors compared to control and, in addition to this improved anti-metastatic effect, synergistically enhanced the type I immune response and decreased immunosuppressive cells in the lung.	Life Science - Drug delivery	Oncology	Drug delivery	Li	Song	Pharm-Pharmaceutical Science	In vivo, mice	Lu B, Liu Y, Huang Y, Chen Y, Sun J, Li S. Cationic Amphiphilic Polymers for Codelivery of Hydrophobic Agents and Nucleic Acids. WO 2019/204799 World Intellectual Property Organization. Patent application published October 24, 2019.	License
	4358	Preserving Harvested Fat Between Grafting Procedures	The multi-functional vessel is a 10cc chamber with Luer Lock ports on both ends and a built-in filtration system. After harvesting fat graft material, the vessel interfaces with the harvesting syringe for easy transfer. Then cryo-protectant solution is added to the vessel and it isstored in a hospital freezer. When necessary, thawing and washing occurs in the same closed system of the storage vessel. Currently, onlyone tissue banking company that offers off-site cryo-storage of adipose tissue grafts,andshipping the material back and forth is expensive and complicates procedure scheduling. Because our system involves storing the tissue on-site, it enables multiple treatments with minimal additional costs after the original fat harvest and processing.	Life Science - Medical Device	Plastic Surgery		Rubin	Joseph	Med-Surgery	Prototype	Published US non-provisional application US-2020-0346208-A1, as well as applications in Europe, Mexico, Canada, Brazil, South Korea, and Japan.	License
	4354	Assessing Circadian Rhythm Wellness with Wearable Monitoring Technology	The mobile Circadian Activity Profiling System (CAPS) provides a means for calculating RAR characteristics as well as the probability of belonging to specific RAR profileslinked with health and wellbeing using sensor data via an Apple watch. Any algorithm can be implemented. Accelerometer data is transmitted to a mobile application with an embedded "wellness algorithm" that calculates the probability of belonging to circadian rhythm profile characteristic of disease risk, i.e., for sleep disruption, depression, and neurocognitive impairment. The ability to track RAR metrics over time allows clinicians to measure treatment response. Derived metrics are updated on a rolling basis and provide a user-friendly means of accessing behavioral health status for patients and their providers. For example, clinicians can track their patients' circadian activity patterns between visits, and use the data to determine if the desired treatment effect –or side effects –occurred.	Life Science - Software - Clinical	Neuroscience	Digital therapeutic	Smagula	Stephen	Med-Psychiatry	Prototype getting raw accelerometer data continuously from the Apple Watch is working. Paper pending validating against the "gold standard" wire-based research accelerometers.	Copyright	NewCo

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	4353	Affinity-Enhanced Biotin-Binding CAR T cells: An Adaptable Cancer Treatment	With our system, patients would receive two treatments. The first is a biotin-tagged antibody that binds to tumor cells. The second is CAR-Ts that react with the tagged antibodies on the tumor cells. By separating the tumor-associated antigen from the CAR T cell, this system is much easier to adapt to changes in tumor antigen expression, allowing for infusion of additional antibodies targeting new tumor antigens. Thisoffers the potential for lower toxicity because the CAR T cell potency is directly controlled by the concentration of tagged antibody. Furthermore, monomeric streptavidin 2 (mSA2) biotin-binding protein domain is engineered to have a25-fold stronger affinityfor target cells compared to other biotin-binding CARs, leading to greater T cell activation and antitumor response. When incubated together with target cells and various biotinylated tumor-specific antibodies, our adaptable mSA2-CARTs had comparable potency to traditional CARs.	Life Science - Cell therapy	Oncology		Lohmueller	Jason	Immunology	In vitro data	Lohmueller J. Msa2 Affinity-Enhanced Biotin-Binding Chimeric Antigen Receptor (CAR). US 2019/0161520. United States Patent and Trademark Office. Patent application published 30 May 2019.	License
	4279	Gene Therapy for Male Infertility without Germline Transmission	To establish the proof-in-principle for testicular somatic cell defects, we designed an adenovirus (Ad) vector to introduce a therapeutic human androgen receptor (hAR) gene into an AR-deficient mouse model of human NOA. Ad-hAR injections restored spermatogenesis in 90 percent of seminiferous tubules in the testes. Histology in these mice showed that Ad-hAR transfects only Sertoli cells — somatic cells that facilitate spermatogenesis— and not the sperm or sperm producing cells. As a result, none of the treated males' progeny carried the transgene. In parallel, we devised a strategy for ex vivo gene editing (using CRISPR/Cas9) followed by transplantation of germline stem cells. In the case of homozygous recessive disease, we outline how this approach can be deployed for germline gene therapy without germline transmission to progeny. For men faced with one of the most intractable types of infertility, our gene therapy method offers a potential cure without the ethical concerns of germline transmission. As societal concerns about germline gene editing evolve, the technologies described here can be used to purposefully eliminate the world's most devastating diseases from families.	Life Science - Gene therapy	Urology		Orwig	Kyle	Med-OB-Gyn & Reproductive Science	In vivo data	Rajkovic A, Yatsenko A, Doungkamchan C, Orwig K. Gene Therapy for Treatment of Infertility. WO 2019/023492. World Intellectual Property Organization. Patent application published on 31 Jan 2019.	License
	4267	Ribosomal Protein-Based Diagnostic and Prognostic Test for Cancer	To identify and classify RP transcript patterns, we applied an advanced form of machine learning called T-distributed stochastic neighbor embedding (T-SNE) that uses a variety of linear and non-linear relationships to cluster data. When applied to human tissue data from the cancer genome atlas, this method was 93%accurate at distinguishing between tissue types and more than 98%accurate at discriminating tumors from normal tissue. In at least ten different common tumors typesincluding hepatocellular carcinoma, kidney, brain and endometrial cancer,the pattern of RP transcripts was also highly predictive of survival. Our proprietary T-SNE-based RP transcript analysis program could form a clinically useful bioinformatics platform to accurately determine a tumor's tissue of origin, classify known tumors into subtypes, and stratify patients into high-andlow-risk categories. This information will be useful for determining the most appropriate treatment plan for individual patients.	Life Science - Molecular diagnostic	Oncology		Prochownik	Edward	Med-Pediatrics	Software	Prochownik EV, Dolezal JM. A Diagnostic and Prognostic Test for Multiple Cancer Types Based on Transcript Profiling. WO 2020/150563 published on 23 July 2020; WO 2019/018374 published on 24 Jan 2019. World Intellectual Property Organization.	License
	4250	Novel Glycine Receptor Modulators for Analgesia	Recognizing that glycine receptors are responsible for the analgesic effects of marijuana, we screened a library of drug-like molecules for structural compatibility with the same glycine receptor binding site as THC. A representative compound from this group – ZINC08 – was even more effective than THC at enhancing human glycine receptor function *in vitro*. In mouse behavioral tests, ZINC08 reduced the effects of inflammatory pain and boosted the efficacy of a sub-therapeutic dose of morphine. Patients and prescribers could use ZINC08 and other glycine receptor modulators in its class to reduce the necessary dose of opioids for pain management, eliminating side effects such as dependence, tolerance, addiction, sedation, and nausea.	Life Science - Small molecule	Central Nervous System		Xu	Yan	Med-Anesthesiology	In vitro and in vivo behavioral data	Xu Y, Tang P, Wells MM. Receptor Modulators and Methods of Use. US 2020/0215047. United States Patent and Trademark Office. Patent application published 09 July 2020. Xu Y, Tang P, Wells MM. Receptor Modulators and Methods of Use. WO 2019/018241. World Intellectual Property Organization. Patent application published 24 Jan 2019.	License
	4181	Chemical Pancreatectomy Using Ethanol Infusion	By one theory of chronic pancreatitis, the exocrine pancreas, which produces digestive enzymes, creates a toxic environment that then kills off the otherwise healthy insulin-producing islets of the endocrine pancreas. We discovered that infusing pure ethanol into the pancreatic duct of a mouse leads to complete destruction of the problematic exocrine pancreas while leaving the endocrine pancreas intact. In a model of chronic pancreatitis, ethanol infusion halted pancreatic islet destruction and improved insulin production. As opposed to a traditional pancreatectomy, our method can be performed endoscopically for minimal invasiveness. Also, because ethanol infusion spares the hormonal functions of the pancreas, our method could treat the painful and carcinogenic aspects of pancreatitis while also reducing patients' risk of developing diabetes.	Life Science - Other	Endocrinology		Gittes	George	Med-Surgery	In vivo mouse data, in situ primate surgical protocol	Gittes G. Methods and Devices for Treating Pancreatitis. WO 2018/226643. World Intellectual Property Organization. Patent application published on 13 Dec 2018.	License
	4124	Targeting Genetic Changes in IDH-Mutant Gliomas with a Novel Use of an FDA-Approved Drug	Our novel use of the drug works by reversing the immune-evasive properties of IDH-mutant gliomas. The immunotherapeutic properties of this compound are due to activation of immune target receptors specifically in cancer cells, rendering them significantly more susceptible to killing by NK cells and T cells. In addition, treatmentreduces tumor size and growth by modulating IDH-mutant cancer cell death and differentiation. Compared to current broad-spectrum treatments like tumor resection, radiation, and chemotherapy, our genetically targeted immunotherapeutic approach may avert tumor recurrence.	Life Science - Small molecule	Oncology	Small molecule	Amankulor	Ndukaku	Med-Neurological Surgery	In vivo mouse and human data	Amankulor N, Rao A. Retinoid Compositions and Methods of Increasing Immune Cell-Mediated Killing of IDH Mutant Cancer Cells. US 10,821,092. United States Patent and Trademark Office. Patent granted 03 Nov 2020.	License
	4085	Targeting Chromosomal Rearrangements for Treatment of Cancer	The present invention relates to methods of detecting and treating patients suffering from cancer or a pre-malignant or neoplastic condition and are carrying one or more specific fusion genes. These specific fusion genes yield insights into disease progression and enable clinicians to tailor specific genome therapies. The chromosomal breakpoints of significant numbers of fusion genes have been identified; these breakpoints not only serve as cancer markers but also provide unique opportunities to treat human cacers using genome editing and genome targeting technologies. Once fusion transcripts are detected in serum samples, novel treatment options include administering a therapeutic effective amount of an agent at the breakpoint that inhibits the fusion gene of interest.	Life Science - Other diagnostic	Oncology		Luo	Jianhua	Med-Pathology	In vivo data	US 9,932,641 US 10,167,519 US 2017/0240924 US 2018/0245162 WO 2018/112090 WO 2018/112098	License
	4054	Reversing Fosfomycin Resistance	Researchers at the University of Pittsburgh have discovered a compound called ANY1 that selectively blocks the mechanism by which bacteria resist fosfomycin treatment. When applied together with ANY1, fosfomycin is once again effective against formerly resistant bacteria. Bacteria mount resistance by deploying fosfomycin-modifying enzymes, most frequently FosA. ANY1 restores fosfomycin sensitivity in these pathogens by competitively inhibiting FosA. In control experiments, ANY1 did not have any impact on bacterial growth when applied alone, nor was it efficacious in conjunction with fosfomycin against a strain of *E. coli* that was engineered to lack the FosA gene. This cocktail presents the opportunity to fight back against so-called superbugs that evade all known current treatments.	Life Science - Small molecule	Infectious Disease		Sluis-Cremer	Nicolas	Med-Medicine	In vitro data	Provisional patent application WO 2018/132547 "Reversal of Fosfomycin Resistance" published on 2018 July 07.	License
	4010	Rapid Response Preventative Vaccines for Zika Virus Outbreak	Pitt researchers have developed a recombinant adenoviral vector-expressing codon-optimized subunit recombinant ZIKV E vaccine combined with a skin-targeting vaccine delivery technology to specifically create advantages in immunogenicity, economy, and safety in order to enable broad, effective clinical deployment. The vaccine delivery strategy utilizes an intracutaneous microneedle array (MNA)-based delivery system, found to be superior to intramuscular administration in both the potency and duration of the induced immune response. The MNA vaccine delivery system also affords unique advantages in reproducibility, safety, manufacturing, and distribution, by relieving pressure on the cost-intensive "cold chain" required to preserve vaccine potency within a restricted temperature range for delivery and distribution in developing countries. The synergistic integration of this effective vaccine and delivery method has distinct advantages critical for widespread clinical deployment.	Life Science - Vaccine	Vaccines		Gambotto	Andrea	Med-Surgery	In vivo data	Gambotto A, Kim E, Erdos G, Falo LD. Zika Virus Vaccines. US 10,913,776. United States Patent and Trademark Office. Patent granted 09 Feb 2021. Gambotto A, Kim E, Erdos G, Falo, LD. Zika Virus Vaccines. WO 2018/064558. World Intellectual Property Organization. Patent application published 05 April 2018.	License
	3959	HerShield: Empowering Women through Innovative Drug Delivery	HerShield is a biodegradable film applied intra-vaginally thatcontains theantiviral drugtenofovir that has demonstrated activity against HSV-2infection when used vaginally. HerShield does not require an applicator. It is both portable and discreet. HerShield is also environmentally-friendly and inexpensive. Two phase I clinical trials have demonstrated that the first generation prototype of HerShield is safe and delivers sufficient quantities of drug for protection from herpes infection.HerShield's demonstrated ability to deliver antiviral medication indicates a potential to deliver antiretrovirals to protect against HIV; moreover, as HSV-2 infection increases the risk of HIV infection, its present application serves as a moderate preventative against HIV as well.	Life Science - Drug delivery	Womens Health		Rohan	Lisa	Pharm-Pharmaceutical Science	Successful phase I clinical tests demonstrate effective antiviral drug delivery	WO/2019/006122 in prosecution PCT/US2018/024505 in prosecution	NewCo
	3955	Triple Variable Index	A novel profiling system, the Triple Variable Index (TVI), will allow clinicians to predict outcomes and stage timely interventions by integrating data representing cardiovascular and neurologic system functions moment-to-moment for individual patients responding to anesthetics and surgery. The TVI system measures mean arterial pressure (MAP), Bispectral Index (BIS), and minimum alveolar concentration (MAC),revealing a distinct pattern of organ system function. These measurements show the tightly regulated functions of multiple organ systems that work in concert to maintain homeostatic balance, and mapping their function over time yields connections to postoperative outcomes. The TVI method provides rapid analysis on an individual basis for a wide population of surgical patients. Surgical cases can be separated into distinct clusters combining Triple Variable Indexing and K-means cluster analysis based on oneof three possible physiological states during surgery represented by an elevated, mixed, or depressed TVI value; further, TVI depression has been shown to correlate with postoperative mortality. These developments will allow clinicians to identify potential points of clinical interventions in a timely manner to decrease patient risk of postoperative death, as well as reducing costs for patients and care providers alike.	Life Science - Software - Clinical	Surgery		Schnetz	Michael	Med-Anesthesiology	Prototype	US 2019-0046122 A1	NewCo
	3916	Mitoparib: A Mitochondrial PARP Inhibitor That Counteracts Metabolic Stress	To hone in on mitochondrial PARP, we added a targeting sequence to the PARP-inhibitor veliparib, which is currently in multiple late-stage clinical trials for cancer, to create mitoparib. Whereas veliparib fights cancer by hastening DNA damage to invoke cell death, mitoparib protects environmentally-stressed cells against cell death by inhibiting PARP-related NAD+ depletion in the mitochondria while permitting homeostatic PARP-related DNA repair in the nucleus. Experiments with oxygen- and glucose-deprived rat neurons demonstrate that mitoparib reduces mitochondrial PARP activity and ameliorates mitochondrial swelling associated with necrosis. In mouse embryos, mitoparib decreases radiation-induced cell death. Mitoparib presents an exciting solution to targeting mitochondrial PARP activity and prevent cell death.	Life Science - Small molecule	Oncology		Wipf	Peter	Chemistry	In vivo data	Bayir H, Clark R, Krainz T, Wipf P. Mitochondrially-Targeted PARP Inhibitor and Uses Thereof. WO 2018/071761. World Patent and Trademark Organization. Patent application published 19 April 2018.	License
Recently Added	3868	Oncolytic Viruses Armed with Membrane-Associated Immunomodulatory Molecules for Cancer Therapy	Oncolytic vaccinia viruses armed with a gene encoding a membrane-associated fusion protein that includes an immunomodulatory molecule can be used to deliver membrane-associated immunomodulatory molecules to the tumor site. Rather than simply lysing the tumor cells and/or secreting the cytokine from the cancer cell, these cytokines are expressed on the cancer cell membrane. This helps to deliver cancer-fighting compounds to areas where they are most needed as well as reducing possible adverse toxicity by avoiding systemic diffusion. Candidate immunomodulatory molecules for this delivery method include cytokines, such as cytokine IL-2, and natural or man-made protein domains and peptides. This method can be used to achieve enhanced anti-tumor immunity and therapeutic effects, and has been demonstrated on a colon cancer model using an oncolytic vaccinia virus expressing membrane-associated fusion protein IL-2-GPI.	Life Science - Drug delivery	Oncology	Immuno-oncology	Bartlett	David	Med-Surgery	In vivo data	Patent applications filed in the United States, Australia, Canada, China, the European Union, Japan, the Democratic Republic of Korea, Hong Kong, and internationally.	License

	3854	Compounds that Convert Acinar Cells into Insulin-Producing Beta Cells	Researchers at the University of Pittsburgh have discovered a compound which, when administered to diabetic mice or non-human primates (NHP) in therapeutic amounts, has the potential to normalize blood glucose by transforming pancreatic acinar cells into beta cells. These acinar-derived beta cells migrate into and embed themselves within the microenvironment of the islets of Langerhans, conferring distinct advantages beyond insulin production, including proximity to blood vessels that provide for increased efficiency of insulin secretion. The acinar-derived insulin-positive cells also express Glut2, suggesting that these cells share features with mature insulin-producing cells.	Life Science - Small molecule	Endocrinology	Small molecule	Esni	Farzad	Med-Surgery	In vivo data	Esni F, Hu J. Focal Adhesion Kinase Inhibitor as a Therapeutic Agent in Diabetes. WO 2018/148666. World Intellectual Property Organization. Patent application published 16 August 2018.	License
	3811	p97 ATPase Inhibitors for Cancer and Neurodegeneration	Structural analysis indicates that these compounds bind allosterically to act literally as a "wrench in the works", blocking the motion of the p97 protein subunits. Inhibition of p97 ATPase activity triggers downstream cellular effects, including the suppression of cellular proliferation that makes cancer such a dangerous disease. And because these compounds specifically inhibit p97, they offer the possibility of treating a wide array of ailments with fewer side effects than drugs acting on broader pathways; neurodegenerative diseases, for example, display dysregulation of protein homeostasis via p97 and have the potential to be treated with these inhibitors.	Life Science - Small molecule	Neuroscience		Huryn	Donna	Pharm-Pharmaceutical Science	In vivo data	Huryn DM, Wipf P, Laporte MG. Modulators of p97 AAA ATPase Activity. US 10,894,782. United States Patent and Trademark Office. Patent granted 19 Jan 2021. Huryn DM, Wipf P, Laporte MG. Modulators of p97 AAA ATPase Activity. WO 2017/197080. World Intellectual Property Organization. Patent application published 16 Nov 2017; nationalized in the US. Huryn DM, Wipf P, Laporte MG. Modulators of p97 AAA ATPase Activity. WO 2018/209083. World Intellectual Property Organization. Patent application published 15 Nov 2018; nationalized in the European Union. Huryn DM, Wipf P. 1,2,3-Triazole Inhibitors of p97 AAA ATPase Activity. WO 2019/200032. World Intellectual Property Organization. Patent application published 17 Oct 2019; nationalized in the US and the European Union. This technology was developed in collaboration with the University of Pennsylvania and Duke University.	License
	3732	Modulation of Ciliogenesis and Regenerative Therapy for Chronic Pulmonary Diseases	DAPT inhibits proteolytic cleavage of Notch, which is the transcription factor responsible for transforming epithelial cells—where cilia sprout—into mesenchymal cells. By pushing the balance toward ciliated epithelial tissue, DAPT may improve lung clearance. In *in vitro* experiments with mouse tracheal tissue, DAPT increased the number, length, and beat frequency of cilia three-fold. Beyond respiratory illness, DAPT may also be useful for treating hydrocephalus—retention of fluid in the ventricles of the brain—by increasing cilia action to help with drainage. Further, the ability of DAPT to improve lung function may prove helpful in the fight against COVID-19.	Life Science - Cell therapy	Respiratory		Zahid	Maliha	Med-Developmental Biology	Ex vivo data	Zahid M, Lo CWY. Compositions and Methods for Modulating Ciliogenesis. US 2019/0336563. United States Patent and Trademark Office. Patent application published 07 Nov 2019.	License
	3547	Light-Activated CRISPR/Cas9: Precise Control over Gene Editing	To achieve spatial and temporal control, we genetically engineered the Cas9 protein to be light-activated. The addition of a caged lysine residue keeps Cas9 dormant by default, but in the presence of light the lysine caging group falls off and Cas9 springs into action. Unlike standard CRISPR/Cas9, which has full reign over the body, our light-activated system offers precisespatial and temporal control over genetic modifications, thereby reducing the chance ofoff-target effects andproviding exclusive targeting of disease tissue.	Life Science - Other	Platform Technology		Deiters	Alexander	Chemistry	In vitro mammalian cell culture data	Deiters A, Hemphill J, Asokan A, Borchardt E. Activatable CRISPR/CAS9 for Spatial and Temporal Control of Genome Editing. WO 2016/164797. World Intellectual Property Organization. Patent application published 13 October 2016.	License
	3178	Novel Carrier Formulation provides enhanced delivery of water-insoluble cancer drugs	A novel drug formulation based on PEGylated FTS, a synthetic farnesylcysteine mimetic, acts as a potent and particularly non-toxic antagonist of the Ras family proto-oncogenes present in one-third of human cancers. FTS inhibits the growth of Ras-dependent tumors with no significant toxicity; in addition to its antitumor activity in mice and humans, FTS also exhibits anti-inflammatory activity. PEGylation serves to improve the solubility of FTS, which has a hydrophobic nature and limited bioavailability. The PEG-FTS conjugate forms small-sized micelles, a type of delivery system that has gained considerable attention due to micelles' small size and ability to solubilize water-insoluble anticancer drugs and accumulate specifically at tumor sites. In this new formulation, both the anticancer drug and the PEG-FTS carrier display antitumor activity and can synergize to amplify the effect. Further, the drug-loading capacity and formulaic stability of the PEG-FTS micellar system can be further improved via incorporation of a drug-interaction motif, leading to the creation and development of highly effective therapeutics with minimal toxicity at a low cost in a timely manner.	Life Science - Small molecule	Oncology		Li	Song	Pharm-Pharmaceutical Science	In vivo data	US 9,855,341 US 10,376,591	License
	3007	Simultanous Inhibition of Wnt, TGF beta and Hippo Signaling Pathways to Treat Cancer and Organ Fibrosis	Building on knowledge of cancer cell reprogramming, researchers have identified a pipeline of novel anticancer agents with dual action on cell proliferation and EMT. C19 is a promising small molecule candidate with remarkable inhibitor activity against Hippo, Wnt and TGF-beta pathways: it induces TAZ degradation through activation (phosphorylation) of Hippo kinases MST/LATS and the tumor suppressor kinase AMPK, which is an upstream regulator of the degradation complex of YAP. It has been demonstrated that C19 inhibits cancer cell migration, proliferation, and resistance to doxorubicin *in vitro* , and exerts strong anti-tumor activity in mouse tumor models. By simultaneously targeting multiple EMT pathways, this novel compound provides a new class of agents that have the potential to not only suppress cancer progression but also prevent its recurrence.	Life Science - Small molecule	Oncology	Small molecule	Rebbaa	Abdelhadi	Med-Pathology	In vivo data	Rebbaa A, Lettan RB. Inhibition of WNT, TGF beta and Hippo Signaling Pathways to Treat Cancer, Organ Fibrosis, and Metabolic Disorders. US 9,649,300. United States Patent and Trademark Office. Patent granted on 16 May 2017.	License
	2941	Treatment of Lung Disease with Novel Water-Soluble Adducts of Michael Acceptors	The previously-unknown compounds disclosed here demonstrate promise for treating various lung diseases. The compounds contain heteroaryl rings and two electrophilic Michael acceptors, which have been found to exhibit therapeutic properties. The Michael acceptors react readily with electron-rich compounds such as thiols and reacts with target intracellular cysteines or other targets once inside the intended cell. Because the therapeutic utility of these compounds is hindered by their limited solubility in aqueous fluids, water-soluble derivatives suitable for delivery by inhalation have been developed; direct delivery or delivery by inhalation offer the added bonuses of maximizing activity at the target organ and minimizing exposure at other tissues. These novel compounds demonstrate antioxidant and anti-inflammatory properties exerted via a mechanism distinct from that of any current pulmonary medication and have not been found to cause lung injury or extrapulmonary pathology. These compounds have produced beneficial effects in animal models of lung diseases including pulmonary fibrosis, acute lung injury, lung cancer, COPD, asthma, and pulmonary hypertension, offering exciting prospects for the future treatment of pulmonary disease.	Life Science - Small molecule	Respiratory		Reddy	Raju	Med-Medicine	In vivo data	Reddy, Raju. Treatment of Pulmonary and Other Conditions. US 10,167,265. United States Patent and Trademark Office. Patent granted 01 Jan 2019. Reddy, Raju. Treatment of Pulmonary and Other Conditions. US 9,862,690. United States Patent and Trademark Office. Patent granted 01 Sep 2018. Patents issued in EP, CN, JP, IL, AU; rights pending in CA, IN, HK, GB.	License
	2659	An Oral Candidate Prevention Therapy for Melanoma	Sulforaphane (SFN) is a naturally occurring compound found in vegetables such as broccoli, cabbage, and cauliflower, among many others. SFN is renowned for its anti-cancer properties and is easily isolated from natural sources. Using our identified formulation and dosage, SFN effectively delayed melanoma progression in mice. Additionally, we identified possible biomarkers for the progression of atypical nevi to melanoma.	Life Science - Small molecule	Oncology		Kirkwood	John	Med-Medicine	In vivo data	Beumer JH, Kirkwood JM, Singh SV, Brown CK. Melanoma chemoprevention. US 9,393,225. Issued 07/19/2016.	License
Recently Added	2474	Predicting and Managing Cardiorespiratory Instability	Machine learning principles, coupled with human physiological data, can enable a data-driven prediction modeling approach to predict if and when patients are likely to develop future instability. Hemodynamic Monitoring Parsimony repurposes routinely acquired non-invasive hemodynamic data to predict cardiorespiratory insufficiency prior to the onset of severe symptoms, determine which additional biomarkers and measuring frequency will improve the accuracy and specificity of these predictions, assess whether the patient is responsive to process-specific interventions, determine if resuscitation has effectively restored tissue perfusion, and identify minimum criteria as to be clinically relevant. This data-driven prediction modeling approach will enable healthcare professionals to predict future instability in patients both at the bedside and in remote settings, yielding immense improvements in patient safety, surveillance and care.	Life Science - Medical Device	Cardiovascular		Pinsky	Michael	Med-Critical Care Medicine	Prototype	US 2014-0107437 A1 "A system and method of determining susceptibility to cardiorespiratory insufficiency," U.S. Patent Application approval, 11-21-19, submitted by the University of Pittsburgh (Michael R. Pinsky, inventor) 12/20/13. International patent WO13/003787 filed 1-03-13. (Initial patent filed 10-20-11) Approved Japan on April 20, 2018, Japanese Patent No. 6325617; approved in Europe on 6/29/12, European Patent No. 18170946.0; approved in China on 12-2-16, awaiting patent no. US patent provisional approval (11-10-19).	License